

Attorney Docket: 127FR/50787
CAM No.: 29182.071

--ABSTRACT OF THE DISCLOSURE

The invention relates to a device for generating extreme ultraviolet and soft x-rays from a gas discharge, operated on the left-hand branch of the Paschen curve. There are two main electrodes, between which there is a gas-filled space, and each main electrode exhibits an opening, by means of which an axis of symmetry [(5)] is defined; and there are means to increase the conversion efficiency. Preferred fields of application are those requiring extreme ultraviolet (EUV) radiation or soft x-rays at a wavelength ranging from approximately 1 to 20 nm, and in particular around 13 nm, such as in EUV lithography--

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Please AMEND claims 1-14 as follows:

1. [Device] A device for generating extreme ultraviolet and soft x-rays from a gas discharge, operated on the left-hand branch of the Paschen curve, [in which device there are] comprising:

two main electrodes [(1, 2)], between which there is a gas-filled space [(7)], wherein each of said two main [electrode (1, 2)] electrodes exhibits an opening, [(3, 4), by means of which] defining an axis of symmetry [(5) is defined;], and wherein the electrodes are formed in such a manner that the gas discharge forms exclusively in the volume, determined by [the aligned] an alignment of the openings [(3, 4)]; and where the plasma channel, generated on the axis of symmetry, is the source for at least one of the [EUV] extreme ultraviolet and [/ or] x-rays;[, characterized in that] and

[there are] means [(8, 9a, 9b, 13a, 13b, 14, 15, 17) to increase the] for increasing conversion efficiency..

2. [Device,] The device as claimed in claim 1, [characterized in that] wherein at least one of the openings [(3, 4)] on the side facing away from the space [(7)] is larger than on the side facing the space [(7)].

3. [Device,] The device as claimed in claim 2, [characterized in that] wherein the openings [(3, 4)] exhibit the shape of a truncated cone.

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4. [Device,] The device as claimed in [at least one of the claims] claim 1, [to 3, characterized in that] wherein the anode opening [(2)] is designed as a non-continuous depression, and in particular as a blind hole.

5. [Device,] The device as claimed in [at least one of the claims] claim 1, [to 4, characterized in that] wherein an auxiliary electrode [(9a, 9b)] is provided.

6. [Device,] The device as claimed in claim 5, [characterized in that] wherein an auxiliary electrode [(9a)] is provided behind the opening [(3, 4)] of one of the main electrodes [(1, 2)].

7. [Device,] The device as claimed in claim 5, [characterized in that] wherein said means for increasing conversion energy includes an auxiliary electrode [(9b)], which exhibits an opening on the axis of symmetry [(5), is] provided between the main electrodes [(1, 2)].

8. [Device,] The device as claimed in [at least one of the claims] claim 1, [to 7, characterized in that both] wherein each of said main electrodes has a plurality of openings [(1, 2) exhibit several openings (14)].

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9. [Device,] The device as claimed in claim 8, [characterized in that] wherein the openings [(14)] in the main electrodes [(1, 2)] are arranged on a circle, through whose center runs the axis of symmetry [(5)].

10. [Device,] The device as claimed in [at least one of the claims] claim 1, [to 7, characterized in that both] wherein each of said main electrodes [(1, 2)] exhibit] has a ring-shaped opening [(17)], whereby the center of the ring [(17)] lies on the axis of symmetry [(5)].

11. [Device,] The device as claimed in [at least one of the claims] claim 1, [to 10, characterized in that] wherein a pulse-forming network [(11)] is provided as [the] a power supply.

12. [Device,] The device as claimed in [at least one of the claims] claim 1 [to 11, characterized in that], wherein, in addition to the gas inlet and outlet opening for the working gas in the electrode space [(7)], there is at least one additional gas inlet or gas outlet opening [(13a, 13b)].

13. [Device,] The device as claimed in [at least one of the claims] claim 1, [to 12, characterized in that] further comprising a system of capillaries, for vacuum separation, [is] provided between the gas-filled space [(7)] and [the] highly evacuated areas [(19)] of the device.

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14. [Device,] The device as claimed in claim 13, [characterized in that] wherein the system of capillaries is a micro channel plate or a Kumakhov lens.